

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Amendment of the Commission's Rules with)	
Regard to Commercial Operations in the 3550-)	GN Docket No. 12-354
3650 MHz Band)	

COMMENTS OF T-MOBILE USA, INC.

T-Mobile USA, Inc. (“T-Mobile”) submits these comments in response to the Notice of Proposed Rulemaking issued by the Commission in the above-referenced proceeding,^{1/} which proposes to create a new Citizens Broadband Service in the 3550-3650 MHz band (“3.5 GHz Band”). T-Mobile applauds the Commission for taking the steps necessary to make additional spectrum available for mobile broadband services. However, in order to make the most efficient use of the 3.5 GHz Band and to meet the growing capacity requirements of commercial wireless systems, the Commission should dedicate at least 50 megahertz of the band for licensed operations.

I. INTRODUCTION AND BACKGROUND

T-Mobile, a wholly-owned subsidiary of Deutsche Telekom AG, is headquartered in Bellevue, Washington, and offers nationwide wireless voice and data services to individual, business and government customers. It is the fourth largest wireless carrier in the United States and serves approximately 33 million subscribers. T-Mobile has continuously implemented new and more efficient technologies to maximize the capacity of its spectrum as well as invested significant funds to expand its spectrum portfolio and rationalize its existing spectrum holdings,^{2/}

^{1/} See *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking, 12 FCC Rcd 15594 (2012) (“NPRM”).

^{2/} See, e.g., *Applications of T-Mobile License LLC and Cellco Partnership d/b/a Verizon Wireless for Consent to Assign Licenses*, Memorandum Opinion and Order and Declaratory Ruling, 27 FCC Rcd 10698 (2012); *Deutsche Telekom AG, T-Mobile USA, Inc. and MetroPCS Communications, Inc. Seek*

making substantial progress in a modernization and 4G evolution effort that will enable Long-Term Evolution (“LTE”) coverage for 100 million U.S. customers by July 2013 and 200 million wireless customers by the end of the year.^{3/} T-Mobile is using its spectrum efficiently^{4/} and has been a leader in, among other techniques, network offload.^{5/} Nevertheless, T-Mobile will require additional capacity for wireless broadband network, offload and backhaul purposes to meet rapidly accelerating consumer demand. As the *NPRM* recognizes and independent studies have confirmed, the demand for wireless broadband capacity is growing much faster than the availability of new spectrum.^{6/} T-Mobile therefore applauds the FCC’s efforts to make additional spectrum available for commercial mobile services in this proceeding and in other contexts.

FCC Consent to the Transfer of Control of PCS Licenses and AWS-1 Licenses and Leases, One 700 MHz License, and International 214 Authorizations Held by MetroPCS Communications, Inc. and by T-Mobile USA, Inc. to Deutsche Telekom AG, Public Notice, 27 FCC Rcd 13407 (2012).

^{3/} See Al Sacco, *T-Mobile Exec on Why Its 4G LTE-Launch Timing is “Perfect”*, CIO (Feb. 13, 2013), available at http://www.cio.com/article/728787/T_Mobile_Exec_on_Why_Its_4G_LTE_Launch_Timing_is_Perfect_; see also T-Mobile Release, *T-Mobile USA Announces Reinvigorated Challenger Strategy* (Feb. 23, 2012), available at <http://newsroom.t-mobile.com/articles/ReinvigoratedChallengerStrategy>.

^{4/} See Declaration of Dennis Roberson, WT Docket No. 12-4, ¶ 13 and Table 2 (March 26, 2012) (showing that T-Mobile’s spectral efficiency exceeds that of Verizon Wireless by more than 50 percent), attached as Exhibit A to Reply of T-Mobile USA, Inc. to Opposition to Petition to Deny, WT Docket No. 12-4 (filed March 26, 2012).

^{5/} See Mike Dano, *T-Mobile USA Offloads 5M Wi-Fi Callers*, FIERCEWIRELESS (Feb. 16, 2011), available at <http://www.fiercewireless.com/story/t-mobile-usa-offloads-5m-wi-fi-callers/2011-02-16> (noting that in 2007 T-Mobile debuted its Hotspot@Home Wi-Fi calling service, which has been used as an offload and coverage enhancement technique).

^{6/} See *NPRM* ¶¶ 2, 14; see also CTIA-The Wireless Association, *Semi-Annual Wireless Industry Survey* (April 13, 2012), available at <http://www.ctia.org/advocacy/research/index.cfm/AID/10316>; Cisco Systems Inc., *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2012-2017* (Feb. 6, 2013), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html.

The Spectrum Act will make additional capacity available through reallocation of non-government and government spectrum.^{7/} In addition, the National Telecommunications and Information Administration (“NTIA”), pursuant to a Presidential Memorandum,^{8/} identified specific spectrum bands primarily used by government entities that could be available for commercial operations, and both the FCC and NTIA have begun to take steps that would make these “fast track” bands available.^{9/} As the Commission is aware, in support of those efforts, T-Mobile has worked closely with the Department of Defense (“DoD”) and other Federal officials to determine how the 1755-1780 MHz spectrum – one of the fast track bands – can be employed by commercial operators.^{10/}

The *NPRM* takes the next step toward making another one of these fast track bands – the 3.5 GHz Band – available for commercial use.^{11/} However, the Commission’s primary proposal in this proceeding would permit the 3.5 GHz Band to be used only in a complicated three-tiered access system which relies on, among other techniques, database and geolocation technologies. Adoption of the Commission’s plan will not allow carriers like T-Mobile to make the most productive use of the spectrum. Accordingly, T-Mobile urges the Commission to make at least 50 megahertz of the 3.5 GHz Band available for licensed use.

^{7/} See 47 U.S.C. § 1401 *et seq.* (“Spectrum Act”).

^{8/} See White House Office of the Press Secretary, *Presidential Memorandum: Unleashing the Wireless Broadband Revolution*, § 1 (June 28, 2010), available at <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution>.

^{9/} See NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands*, at iv (Oct. 2010) (“Fast Track Report”), available at http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf.

^{10/} See *NPRM* ¶ 36.

^{11/} See *Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum*, Public Notice, 26 FCC Rcd 3486 (2011) (seeking comment on whether and to what extent the spectrum bands in NTIA’s Fast Track Report, including the 3.5 GHz Band, could be used for broadband services).

II. COMMENTS

A. Carriers Have Small Cell and Backhaul Needs That Can Be Accommodated By the 3.5 GHz Band.

The Commission recognizes that the 3.5 GHz Band holds great potential for small cell applications, but states that it is not ideal for exclusive licensed commercial mobile broadband uses.^{12/} The Commission's statement incorrectly assumes that spectrum designated for small cell operations is best employed on an unlicensed basis. However, licensed providers also need small cell capacity, and licensed spectrum designated for small cell operations can be effectively integrated into carriers' networks. Carriers currently make extensive use of unlicensed spectrum in the 2.4 GHz and 5 GHz bands for, among others, offloading purposes.^{13/} T-Mobile has a long and proud history of using unlicensed spectrum. From the launch of a nationwide Wi-Fi hotspot network, to the early incorporation of Wi-Fi into handsets, to being the only major carrier to provide Wi-Fi-based calling, unlicensed spectrum is an important tool in the T-Mobile spectrum toolkit. While T-Mobile and other carriers use unlicensed spectrum today for offloading, it does not follow that all offload spectrum should be available on an unlicensed basis only. To the contrary, carriers can make even greater use of spectrum for broadband capacity if that spectrum is made available to them on an exclusive basis through licensing. Licensed spectrum provides significantly greater certainty, allowing more complete integration into carrier networks using LTE technology for both wide-area cells and small cells.

^{12/} See NPRM ¶¶ 19-20.

^{13/} See Cisco Systems Inc., *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2012-2017* (Feb. 6, 2013), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html (finding that "33 percent of total mobile data traffic was offloaded onto the fixed network through Wi-Fi or femtocell in 2012" and that "[w]ithout offload, mobile data traffic would have grown 96 percent rather than 70 percent in 2012"); Sue Marek, *Mobile Broadband Usage Is Skyrocketing-and So Are the Number of Projections*, FIERCEWIRELESS (Feb. 27, 2012), available at <http://www.fiercewireless.com/story/mobile-broadband-usage-skyrocketing-and-so-are-number-projections/2012-02-27> (reporting that Alcatel-Lucent expects that "50 percent of [mobile] traffic will be on cellular networks while the remaining 50 percent will be off-loaded to Wi-Fi" over the next few years).

While small cell use is the primary way that the Commission has envisioned that the 3.5 GHz Band may be deployed, it may also be used by carriers simultaneously for backhaul. Studies have shown that the demand for mobile backhaul will grow at a rate of nearly 58 percent between 2011 and 2016.^{14/} Like its potential use in small cells, carriers will more intensively deploy the 3.5 GHz Band for backhaul, likely from outdoor small cells initially, if it is available for licensed operations allowing more effective integration into network planning for reliable service without the threat of interference inherent in unlicensed or shared use.

The Commission correctly notes that wireless carriers did not identify the 3.5 GHz Band for mobile broadband network services in 2011.^{15/} However, at that time, carriers were simply stating their preference for the 1755-1850 MHz band over the 3.5 GHz Band for use in traditional cellular architecture style formats.^{16/} They did not intend their statements to preclude the availability of the 3.5 GHz Band for other uses in mobile communications systems.

B. The Commission's Proposed Multi-Tier Approach to the 3.5 GHz Band is Unnecessary and Overly Complicated.

Instead of proposing to use the 3.5 GHz Band for licensed use, the Commission would provide three tiers of access to the band on a “licensed-by-rule” basis: (1) Incumbent Access; (2) Priority Access; and (3) General Authorized Access (“GAA”). The Incumbent Access would include authorized Federal and grandfathered Fixed Satellite Service (“FSS”) operators, which

^{14/} See iGR, *U.S. Mobile Backhaul Forecast: 2011-2016* (2012), available at https://igr-inc.com/Advisory_And_Subscription_Services/Small_Cell_Architectures/us_mobile_backhaul_forecast_2016.asp; *U.S. Mobile Backhaul Demand Forecast To Grow More Than Nine Times in the Next Four Years*, FIERCEWIRELESS (March 13, 2012), available at <http://www.fiercemobilecontent.com/press-releases/us-mobile-backhaul-demand-forecast-grow-more-nine-times-next-four-years>.

^{15/} See *NPRM* ¶ 46.

^{16/} See, e.g., Comments of T-Mobile USA, Inc., ET Docket No. 10-123 (filed April 22, 2011) (“T-Mobile Fast Track Comments”) (noting that “[m]obile broadband technologies work best in spectrum below 3 GHz”).

would be afforded protection from all 3.5 GHz Band users.^{17/} The Priority Access tier would include critical use facilities such as utilities, public safety entities, and others that would be afforded “quality-assured” access to a portion of the 3.5 GHz Band in certain designated locations.^{18/} The GAA tier would include all other users, including mobile service providers, which would be required to protect and accept interference from Incumbent Access and Priority Access users.^{19/} The Commission envisions utilizing a spectrum access system (“SAS”), incorporating a dynamic database, to manage access to the 3.5 GHz Band and interference among these users.^{20/}

This multi-tiered proposal is overly complex and will prevent the 3.5 GHz Band from being used as efficiently as possible. As the Commission recognizes, NTIA’s recommendation for the 3.5 GHz Band in its Fast Track Report included significant geographic restrictions to protect existing DoD radar and FSS operations.^{21/} The Commission’s proposal adds the need to protect other users through a geolocation and database mechanism. Therefore, instead of restricting the use of the band in only one way – protecting Federal operations – the Commission would even further limit the use of the band.

This attempt at multiple forms of protection for different users will create a “Swiss cheese” effect in the 3.5 GHz Band. While Incumbent Access users and Priority Access users would use the SAS to enforce their rights to protection, GAA users would rely on the database to identify available spectrum for their operations. The three-tier approach would provide no

^{17/} See *NPRM* ¶¶ 65-69.

^{18/} See *id.* ¶¶ 70-74.

^{19/} See *id.* ¶¶ 75-76.

^{20/} See *id.* ¶¶ 95-108.

^{21/} See *id.* ¶ 18.

certainty regarding when the spectrum will be available for GAA operations and therefore create a disincentive for its use.

By including additional restrictions, the Commission would depress the utility of the 3.5 GHz Band as well as the development of the equipment market for this spectrum. Manufacturers face technical challenges incorporating additional bands into handsets and infrastructure and generally do not include new bands absent reasonable expectations of consumer demand and equipment volume. Because the proposed additional restrictions will make channel access uncertain, manufacturers will be hesitant to include the band within consumer devices or incorporate them into network infrastructure.

The Commission itself acknowledges that there may be more efficient ways to enable spectrum use and that other mitigation techniques may be able to manage access to the 3.5 GHz Band.^{22/} T-Mobile agrees. While T-Mobile proposes that at least 50 megahertz of spectrum be licensed, if any of the band is used for unlicensed operations, spectrum sensing techniques similar to those used by unlicensed devices in the 5250-5350 MHz and 5470-5725 MHz bands (together the “5 GHz Band”) may be the more appropriate method to avoid causing interference to DoD radars.^{23/} Because DoD operations are largely on mobile platforms and used on an intermittent basis, a sensing arrangement similar to that used in the 5 GHz Band will better allow the spectrum to be used for broadband services when radars are not operating, while ensuring that the spectrum is available for radar use when needed. For more static operations, such as FSS receive locations, a database approach would be a sufficient interference mitigation mechanism. T-Mobile supports further studies on interference avoidance and mitigation

^{22/} See *id.* ¶¶ 102 n.205, 146.

^{23/} See 47 C.F.R. § 15.407(h)(2); *Revision of Parts 2 and 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band*, Report and Order, 18 FCC Rcd 24484, ¶ 29 (2003).

techniques in any segment of the 3.5 GHz Band that remains unlicensed. However, the Commission's proposal envisions interference avoidance and mitigation in a way that will impede, not promote, the unlicensed use of the 3.5 GHz Band.

C. The Commission Should Make at least 50 Megahertz of the 3.5 GHz Band Available for Licensed Use, Subject to Auction.

The Commission proposes that the 3.5 GHz Band be licensed-by-rule, essentially resulting in an unlicensed framework.^{24/} An exclusive licensing approach, however, would better protect incumbent users, simplify sharing and facilitate greater spectrum use, align with the FCC's spectrum auction obligations, and accommodate a wider variety of technologies. The Commission should therefore assign at least 50 megahertz of 3.5 GHz Band spectrum on an exclusive licensed basis.

First, licensed use would provide greater protection for incumbent users. Carriers with exclusive licenses could simply coordinate with incumbent users and deploy their systems in a manner that avoids interference. A licensed framework would also reduce the universe of potential entities that could affect incumbent users, possibly even to carriers, like T-Mobile, that are already accustomed to working with Federal users to protect incumbent operations.^{25/}

Second, licensed operations would facilitate greater use of the spectrum. Licensing and direct coordination with incumbent users, for instance, would allow carriers to negotiate additional use of the spectrum. Carriers could also adopt tailored solutions, such as indoor deployments, that can operate as close as possible to incumbent users, thereby maximizing spectrum use, without causing interference. Except for television white spaces, for which there has been limited commercial deployment, the other successful examples of sharing that the

^{24/} See NPRM ¶¶ 75-76.

^{25/} See T-Mobile Fast Track Comments at 11-12.

Commission cites in the *NPRM* involve direct coordination between users.^{26/} Such direct coordination can be more easily accommodated with licensed users.

Third, licensed use better conforms with the Commission's obligations to auction spectrum that can be used for commercial purposes. Section 309(j) of the Communications Act requires the FCC to auction spectrum that will be used to provide commercial wireless services in the event that mutually exclusive applications are received.^{27/} By utilizing a license-by-rule framework for the 3.5 GHz Band, the Commission would be excused from auctioning the spectrum because it would not receive any such mutually exclusive applications. The Commission notes that it has already licensed an array of services by rule, including the Family Radio Service, Low Power Radio Service, and the Medical Device Radiocommunication Service, among others.^{28/} However, those are not commercial services. In contrast, the 3.5 GHz Band can be used to support commercial communications and the FCC would certainly receive numerous competing applications for its use. The Commission should therefore not exempt the entire 3.5 GHz Band – which otherwise could be used for commercial services – from auction by deciding *a priori* that spectrum sharing technology will be used.

Finally, the 3.5 GHz Band can accommodate technologies other than those the Commission envisions – some of which are optimal for licensed use.^{29/} The Commission acknowledges that Wi-Fi technology is considered to be the prevalent example of small cell operations and thus may be used in the 3.5 GHz Band.^{30/} However, LTE, which carriers are expected to use for future broadband wireless networks, can also be used in the 3.5 GHz Band.

^{26/} See *NPRM* ¶¶ 34-37.

^{27/} See U.S.C. § 309(j)(1).

^{28/} See *NPRM* ¶ 63.

^{29/} See *id.* ¶¶ 6, 30-33.

^{30/} See *id.* ¶ 33.

Indeed, there are already two 3GPP band classes – band class 41, which covers the 3400-3600 MHz band, and band class 42, which covers the 3600-3800 MHz band. Both of these band classes support Time Division Duplex operations, which carriers can use for offload traffic. Moreover, Frequency Division Duplex band classes for the 3.5 GHz Band may be developed in the future, which may also support licensed small cell use. Accordingly, while T-Mobile uses and supports the availability of additional unlicensed spectrum, at least 50 megahertz of the 3.5 GHz Band can and should be used on a licensed basis. The Commission has other opportunities, such as additional 5 GHz spectrum, to support more unlicensed operations.^{31/}

III. CONCLUSION

T-Mobile continues to support the Commission's efforts to bring additional spectrum to the mobile broadband market. The 3.5 GHz Band holds great potential for carriers to use small cell applications for offload and backhaul traffic. In order to fully realize those benefits, while still protecting important incumbent users, the Commission should make at least 50 megahertz of the 3.5 GHz Band available for licensed use.

Respectfully submitted,

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^{31/} See *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 13-49, FCC 13-22 (rel. Feb. 20, 2013).